11, wherein the single optical element is a single refracting optical element.

A5

14. (New) The imaging optical system according to claim 2, wherein the imaging optical system is capable of either an imaging function to form an enlarged image of the first conjugate plane on the second conjugate plane or an imaging function to form a reduced image of the second conjugate plane on the first conjugate plane.

REMARKS

The above amendments to the specification are supported by Figs. 27(a), 27(b), 33(a) and 33(b) of the drawings as filed and by the discussion of Figs. 33(a) and 33(b) on page 5 of the specification.

The amendments to the Claims reflect the results of International Preliminary Examination. Please see the accompanying English-language translation of the Response to the Written Opinion issued by the JPO acting as the IPEA. This Response discusses the amendment made to Claim 1 and the prior art cited by the Japanese Examiner. New Claim 12 describes that the second optical system consists of a single reflecting element as shown in Fig. 1. New Claim 13 describes that the second optical system consists of a single refracting element as shown in Fig. 4.

This Preliminary Amendment also amends Claim 3 so that this

claim is no longer multiply dependent in order to reduce the official fees. New Claim 14 is added to provide similar coverage. The Applicant may elect to amend Claim 3 to make it again multiply dependent or to add additional claims to this application to provide coverage similar to, broader than, or narrower than the present claims at any time during the pendency of the above-identified U.S. application.

Respectfully submitted,

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Enclosure: Appendix A (6 pages)
Appendix B (4 pages)

Appendix A

(VERSION WITH MARKINGS TO SHOW CHANGES MADE)

Page 1 of 6

Please amend the third paragraph on page 2 of the specification (see lines 26-37 on page 2) as indicated below.

(amended)

[Fig. 27 shows]Figs. 27(a) and 27(b) show a projection lens for a projector disclosed in JP-A No. Hei 05-273460 in a sectional view. A projection lens 30 consisting of refracting optical elements, and an image-forming device 2 are moved perpendicularly to the optical axis 3A of the projection lens 30 relative to each other to realize an oblique-incidence imaging optical system. To avoid moving a condenser lens 301 disposed near the image-forming device 2, the optical axis of the projection lens 30 is tilted when moving the projection lens 30. Therefore, it is considered that this oblique-incidence imaging optical system is basically of the decenter system and uses tilting for the degree of freedom of correction.

Appendix A

(VERSION WITH MARKINGS TO SHOW CHANGES MADE)

Please amend the BRIEF DESCRIPTION OF THE DRAWINGS on pages 19-22 as indicated below.

(amended)

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view of a projector, i.e., an oblique-incidence imaging optical system, in a first embodiment according to the present invention;

Fig. 2 is a diagrammatic view showing the convergence of light beams emerging from a first optical system included in the projector in the first embodiment;

Fig. 3 is a sectional view of the first optical system of the projector in the first embodiment;

Fig. 4 is a sectional view of a projector, i.e., an oblique-incidence imaging optical system, in a second embodiment according to the present invention;

Fig. 5 is a diagrammatic view showing the convergence of light beams emerging from a first optical system included in the projector in the second embodiment;

Fig. 6 is a sectional view of a projector, i.e., an oblique-incidence imaging optical system, in a third embodiment according to the present invention;

Fig. 7 is a diagrammatic view showing the convergence of light beams emerging from a first optical system included in the projector in the third embodiment;

Appendix A

(VERSION WITH MARKINGS TO SHOW CHANGES MADE)

Fig. 8 is a sectional view of the first optical system included in the projector in the third embodiment;

Fig. 9 is a sectional view of a projector, i.e., an oblique-incidence imaging optical system, in a fourth embodiment according to the present invention;

Fig. 10 is a front elevation of the projector in the fourth embodiment;

Fig. 11 is a diagrammatic view showing the convergence of light beams emerging from a first optical system included in the projector in the fourth embodiment;

Fig. 12 is a sectional view of the first optical system included in the projector in the fourth embodiment;

Fig. 13 is a sectional view of a rear projection display, i.e., an oblique-incidence imaging optical system, in a fifth embodiment according to the present invention;

Fig. 14 is a front elevation of the rear projection display in the fifth embodiment;

Fig. 15 is a diagrammatic view showing the convergence of light beams emerging from a first optical system included in the rear projection display in the fifth embodiment;

Fig. 16 is a sectional view of the first optical system and a second optical system included in the rear projection display in the fifth embodiment;

Fig. 17 is a sectional view of a rear projection display, i.e., an oblique-incidence imaging optical system, in a sixth embodiment according to the present invention;

Fig. 18 is a front elevation of the rear projection display in the sixth embodiment;

Fig. 19 is a sectional view of a first optical system included in the rear projection display in the sixth embodiment;

Fig. 20 is a sectional view of a projector in a seventh embodiment according to the present invention;

Fig. 21 is a sectional view of a first optical system included in the projector in the seventh embodiment;

Fig. 22 is a sectional view of a rear projection display in an eighth embodiment according to the present invention;

Fig. 23 is a sectional view of a rear projection display in a ninth embodiment according to the present invention;

Fig. 24 is a diagrammatic view of assistance in explaining the principle of an oblique-incidence imaging optical system of the decenter system;

Fig. 25 is a diagrammatic view of assistance in explaining the principle of an oblique-incidence imaging optical system of the tilt system;

Fig. 26 is a conceptual diagrammatic view of assistance in explaining the distortion of an image formed by an oblique-incidence imaging optical system of the tilt system;

[Fig. 27 is a sectional view]Figs. 27(a) and 27(b) are sectional views of a projection lens disclosed in JP-A No. Hei 05-273460;

Fig. 28 is a sectional view of a projector disclosed in U.S. Pat. No. 5,871,266;

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(VERSION WITH MARKINGS TO SHOW CHANGES MADE)

Fig. 29 is a sectional view of a projection lens disclosed in JP-A No. Hei 10-206791;

Fig. 30 is a sectional view of assistance in explaining a mode of image projection by the projector disclosed in JP-A No. Hei 10-206791;

Fig. 31 is a sectional view of a rear projection display disclosed in U.S. Pat. No. 5,274,406;

Fig. 32 is a sectional view of a projection lens included in the rear projection display disclosed in U.S. Pat. No. 5,274,406;

[Fig. 33 is a perspective view]Figs. 33(a) and 33(b) are perspective views of Fresnel mirrors employed in the rear projection display disclosed in U.S. Pat. No. 5,274,406;

Fig. 34 is a sectional view of a projection optical system included in an oblique-incidence imaging optical system disclosed in JP-A No. Hei 06-265814;

Fig. 35 is a diagrammatic view of assistance in explaining a multistage tilt system;

Fig. 36 is a sectional view of a pupil-coupling element employed in the multistage tilt system;

Fig. 37 is a sectional view of a rear projection display disclosed in JP-A No. Hei 07-13157;

Fig. 38 is a sectional view of a projector disclosed in JP-A No. Hei 09-179064;

Fig. 39 is a sectional view of a projection lens included in the projector disclosed in JP-A No. Hei 09-179064;

Appendix A

(VERSION WITH MARKINGS TO SHOW CHANGES MADE)

Fig. 40 is a diagrammatic view of assistance in explaining the principle of an afocal tilt system;

Fig. 41 is a sectional view of a typical head-mounted display (HMD);

Fig. 42 is a sectional view of a HMD disclosed in JP-A No. Hei 05-303055;

Fig. 43 is a sectional view of a HMD disclosed in JP-A No. Hei 07-191274;

Fig. 44 is a sectional view of a HMD disclosed in JP-A No. Hei 07-191274;

Fig. 45 is a sectional view of a HMD disclosed in JP-A No. Hei 10-239631; and

Fig. 46 is a conceptual view of a videophone system disclosed in JP-A No. Hei 06-133311.

Appendix B

(VERSION WITH MARKINGS TO SHOW CHANGES MADE)

Please amend the Claims as indicated below.

1. (Amended) An imaging optical system comprising:

a first optical system having a part around its reference axis for converging a light beam emerging from an optional point in a predetermined range on a first conjugate plane and diverging at a divergence angle of 10° or greater; and

a second optical system having a part around its reference axis for diverging the light beam emerging from the first optical system;

wherein an enlarged image similar to an image in a predetermined range on the first conjugate plane is formed on a second conjugate plane; and

distance S1 along the reference axis of the first optical system between the first optical system and the second optical system, distance S2 along the reference axis of the second optical system between the second optical system and the conjugate plane B, distance L1 to a first converging point where distance along the reference axis of the first optical system in all sections of the light beam including principal rays is the longest, distance L2 to a second converging point where distance along the reference axis of the first optical system in a section of the light beam different from the aforesaid section is the shortest, distance L11 relating to a light beam emerging from a position the nearest to the reference axis of the first

Appendix B

(VERSION WITH MARKINGS TO SHOW CHANGES MADE)

optical system among the distances L1 to the first converging point, distance L21 relating to a light beam emerging from a position the nearest to the reference axis of the first optical system among the distances L2 to the second converging point, distance L1n relating to a light beam emerging from a position the remotest from the reference axis of the first optical system among the distances L1, distance L2n relating to a light beam emerging from a position the remotest from the reference axis of the first optical system among the distances L2, distance D1 relating to an optional light beam emerging from a predetermined range on the first conjugate plane and along the optional light beam between the first and the second optical system, and distance D2 along the light beam between the second optical system and the second conjugate plane satisfy conditions expressed by:

$S1 \leq L11 \leq S1 + S2$

$S1 \leq L21 \leq S1 + S2$

$L11/L1n < 0.25$

[$|L21/L2n| < 1.5$] $0 < L21/L2n < 1.5$

$D1 < D2$

3. (Amended) The imaging optical system according to claim 1 [or 2], wherein the imaging optical system is capable of either an imaging function to form an enlarged image of the first conjugate plane on the second conjugate plane or an imaging function to form a reduced image of the second conjugate plane on the first conjugate plane.